

LT6658

Precision Dual Output, High Current, Low Noise, Voltage Reference

DESCRIPTION

Demonstration circuit 2432A features the [LT®6658](#), a precision 2.5V dual output reference that combines the performance of a low drift low noise reference and a linear regulator. Both outputs are ideal for driving the precision reference inputs of high resolution ADCs and DACs, even with heavy loading while simultaneously acting as output supplies for powering microcontrollers and other supporting devices. Both outputs have the same precision specifications and track each other over temperature. Both outputs are nominally 2.5V; however, each can be

configured with external resistors to give an output voltage up to 6V.

Using Kelvin connections, the LT6658 typically has 0.1ppm/mA load regulation with up to 150mA load current. A noise reduction pin is available to band-limit and lower the total integrated noise.

Design files for this circuit board are available at <http://www.linear.com/demo/DC2432A>

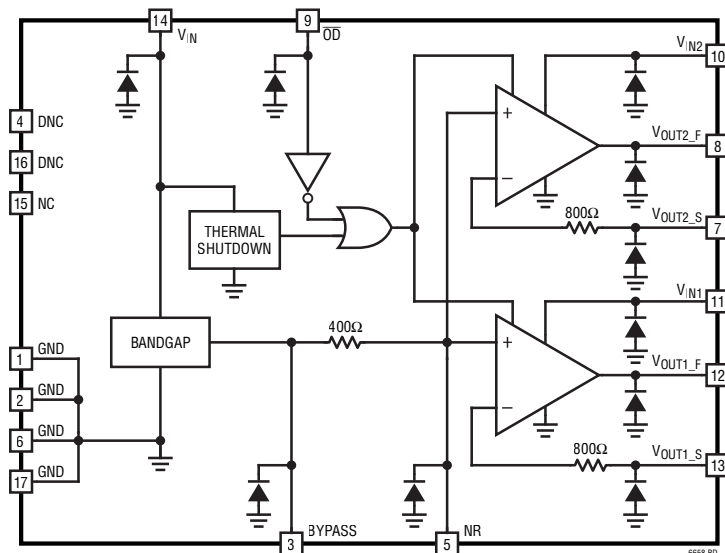
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PERFORMANCE SUMMARY

Specifications are at $T_A = 25^\circ\text{C}$

SYMBOL	PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
V_{IN}	Input Supply Range		5V		36	V
V_{OUT}	Output Voltage Accuracy		-0.05		+0.05	%
Temperature Drift					10	ppm
I_Q	Supply Current			2		mA
Load Regulation	OUT1	0mA to 150mA			1	ppm/mA
Load Regulation	OUT2	0mA to 50mA			1.5	ppm/mA

LT6658 BLOCK DIAGRAM



dc2432af

QUICK START PROCEDURE

With the demonstration circuit, it is easy to set up and evaluate the performance of the LT6658. Refer to Figure 1 for proper measurement equipment setup and follow the procedure below.

1. With the power off, connect the power supply positive to V_{IN} and the common to GND. With default settings, the supply can range from $V_{OUT} + 2.5V$ to 36V.
2. Connect a DVM to the V_{OUT} turret OUT1 with the common connection attached to ground.
3. Turn on power supply and confirm reference operation on OUT1, and also OUT2.

JUMPER SUMMARY

JP1: V_{IN} Input Selection. This jumper has 3 positions:

1. SEP: Separates the V_{IN} from the V_{IN1} and V_{IN2} output buffer supplies
2. COM/V2: Shorts the V_{IN2} output buffer supply pin to V_{IN}
3. COM/V1: Shorts the V_{IN1} output buffer supply pin to V_{IN}

JP2: V_{IN1}/V_{IN2} Output Buffer Supply Connection:

1. SEP: Separates the V_{IN1} and V_{IN2} output buffer supply
2. COM: Shorts the V_{IN1} and V_{IN2} output buffer supplies

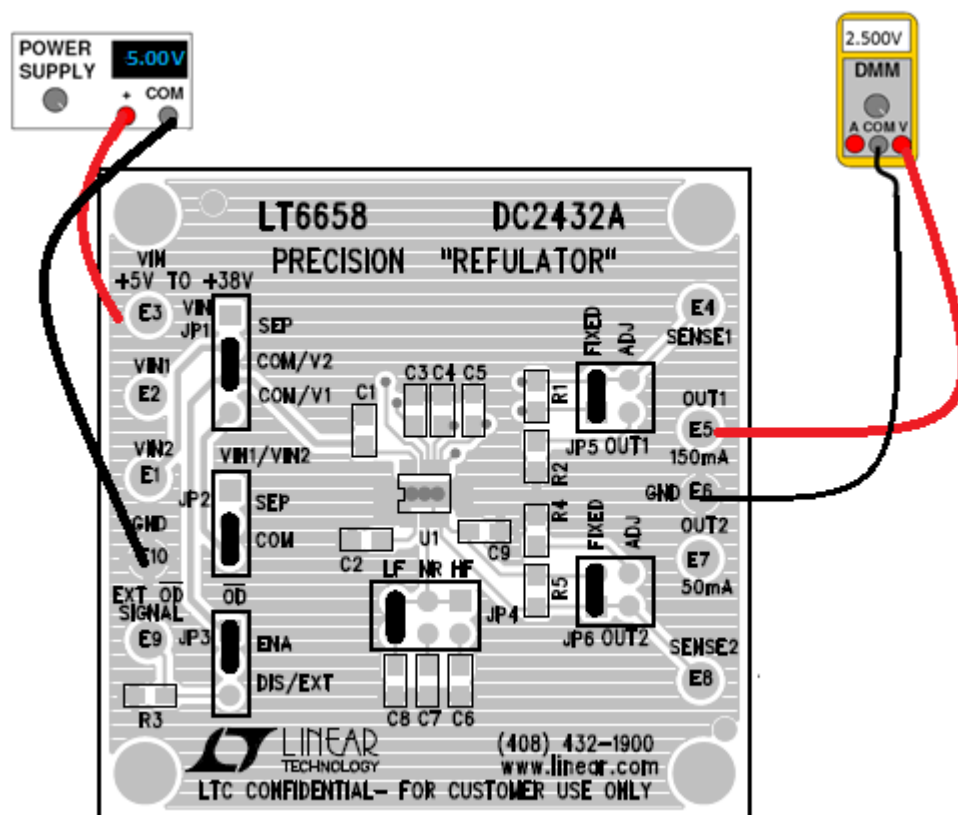


Figure 1: Test Setup

QUICK START PROCEDURE

JP3: $\overline{OD}$ Output Disable:

1. ENA: Enables the outputs
2. DIS/EXT: Disables the outputs or allows the $\overline{OD}$ pin to be driven externally.

JP4: Noise Reduction Select:

1. LF: 10 μ F
2. NF: Optional cap
3. HF: 0.1 μ F

JP5: OUT1 Select:

1. Fixed: OUT1 sense line is shorted to OUT1 Force and the output is fixed.
2. ADJ: OUT1 sense line is separated from OUT1 Force allowing for resistors R1 and R2 to be installed and programming the OUT1 voltage to a different value.

JP6: OUT2 Select:

1. Fixed: OUT2 sense line is shorted to OUT2 Force and the output is fixed.
2. ADJ: OUT2 sense line is separated from OUT2 Force allowing for resistors R4 and R5 to be installed and programming the OUT2 voltage to a different value.

OPTIONAL SETTINGS

1. Programming the Output Voltage

By separating the V_{OUT_S} line from the V_{OUT_F} and using 2 resistors to create a divider in the feedback of the output amplifier, the reference output can be programmed from 2.5V to 6V. The output voltage range is limited on the high side due to internal ESD clamps that protect the pins when the voltage goes above 6V. The output voltage can be set using the equation:

$$V_{OUT} = V_{REF} \cdot (R1 + R2)/R2 \text{ with } V_{REF} = 2.5V$$

The resistors will affect the temperature drift and accuracy of the LT6658 output, so care should be given when choosing resistors. It is crucial that the resistor ratio stay consistent over temperature to guarantee the best reference performance.

2. Setting the Noise Reduction

The noise reduction pin can be used to filter the reference output. The demo board comes with two pre-installed capacitors that can be selected with the NR jumper. The effects of the different capacitors are shown in Figure 2.

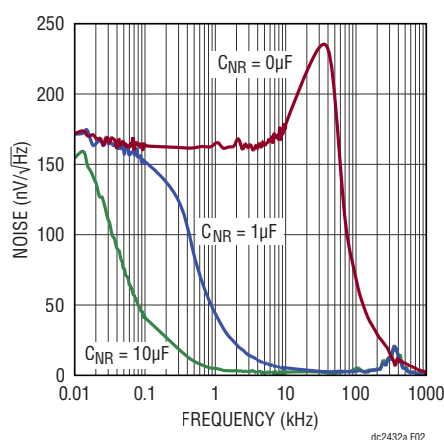


Figure 2

DEMO MANUAL DC2432A

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This notice contains important safety information about temperatures and voltages. For further safety concerns, please contact a LTC application engineer.

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